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Is Banking Really Prone to Panics?

Much of the social justification for deposit insurance springs from concerns over contagious bank runs, or "panics." In a panic, a run at one bank (justified or not) precipitates runs at other, inherently healthy banks. When a panic occurs, it may result in a significant, and costly reduction in total banking capacity and an attendant burden on the economy.

The private market may not adequately protect against contagious runs (through, for example, higher capital and liquidity levels). This is because individual bank managers are concerned only about their own profitability, and have no incentive to limit the negative burdens or "externalities" they impose on other banks. Deposit insurance and the regulation of bank capital thus can be justified as a means of controlling the externality problem by limiting the tendency to run and increasing the protection against runs.

Despite its importance to bank policy, the theory and empirical evidence of contagious runs is scanty. In this *Letter*, we discuss the notion of contagious runs as a consequence of rational "signal extraction," and use data from the behavior of bank stock returns to demonstrate that there may, indeed, be a tendency for banking to be prone to contagious runs.

Contagious runs

Policymakers' concern about contagious runs or "panics" in banking has its roots in the turbulent, early history of U.S. banking. According to Klebaner (1974), for example, about 25 percent of all banks that had ever existed had failed by 1861, most during a panic. Significant banking panics also occurred in 1873, 1884, 1890, 1893, and 1907. And in all cases but one (1890), the panic was followed by a deep depression.

The banking panics of this early period were often regional and often involved the largest banks first. The panic of 1907, for example, began with runs on the third largest and then the second largest banks in New York City. The panic spread first to smaller New York institutions, and only later to country banks and other communities, a pattern repeated in the 1930s.

While this experience was, and still is, frequently taken as evidence of the importance of controlling bank runs, there have been recent challenges to this interpretation. Benston, et al. (1986), for example, believe that the rate of bank failures was often much less than reported. In addition, it is possible that the episodes of bank runs and failures occurred because of widespread economic weakness, and not the other way around; hence, the widespread runs were not the result of a "contagion," but simply runs on many individually weak banks.

A theory of contagion

To help resolve the issue of the relevance of contagious runs, we need a testable, theoretical justification for a banking panic. That is, can we posit a situation in which the depositors of banks are well-informed and rational, yet still will tend to "panic" and run on healthy banks?

King and Wadhwani (1990) recently presented a model of contagion of stock market crashes that seems to offer a relevant framework for a "rational panic" in financial markets. This author has adapted their model to study the case of banking panics. The model assumes that investors (depositors or equity holders) in a particular bank recognize that the value of their investments depends upon two general types of factors. The first are factors that affect the banking industry, such as general economic conditions, or conditions in particular asset markets that banks have in common. Second are factors that are idiosyncratic to individual banks, such as the behavior of assets peculiar to an individual bank.

At any point in time, of course, the depositors and other investors in the individual banks can make only imperfect estimates of the behavior of these factors, because their information is imperfect. In so doing, the behavior of Bank B may be of interest to depositors in Bank A because of common factors. Consequently, one task of the depositors in Bank A is to efficiently extract useful information from the behavior of Bank B, while recognizing their mutual dependence on common factors. In economic parlance, this involves rationally deriving an "efficient signal extraction" rule.

A consequence of this signal extraction process is that depositors in Bank A will react to the idiosyncratic factors that affect Bank B. That is, it can be shown that information that should only be "bad news" for Bank B can propagate to Bank A. This is because the efficient search for common information tends to be contaminated by idiosyncratic effects.

Measuring the contagion effect

Whether this contagion effect is important empirically depends upon the validity of the assumptions of imperfect information, and the tendency of depositors in Bank A to look to Bank B for insight on common factors. Thus, it is important to test the strength of the contagion effect empirically.

Information on the behavior of depositors in individual banks is not easily available. The behavior of equity holders, on the other hand, is easily observed for those banks with traded stocks. The approach taken here, therefore, is to examine the behavior of stock returns at various individual banks for evidence of a contagion effect. Presumably, equity holders are better informed than depositors so, if anything, their tendency to be affected by idiosyncratic information should be less than for depositors.

The empirical implementation of such a study involves regressing the returns to stockholders of Bank A in each period on the returns to stockholders of Bank B in the same period. That is, the theory predicts that the greater the contagious propagation of idiosyncratic information, the greater should be the regression coefficient linking the two returns.

From a statistical viewpoint, such a regression is plagued by an important problem. Since contemporaneous returns data are used for both banks, a simple regression would not be able to distinguish the effect of A on B from that of B on A. (This is called simultaneous equations bias.) As it turns out, this problem can be resolved in the estimation process using the lagged return on A as a statistical "instrument."

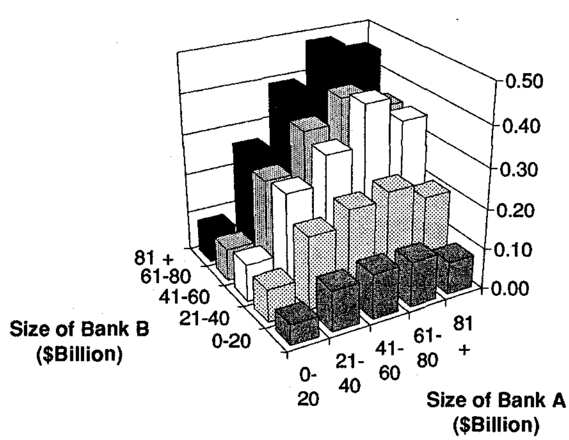
Statistical findings

Using this statistical method, regressions were run using daily returns data from the 54 banks whose stocks have been traded continuously for the past 10 years. Each bank's return was regressed on every other bank, resulting in 2862 regressions, each with about 2500 observations. The contagion coefficients were extracted from each of these regressions, and examined for relationships to the characteristics of the individual banks involved.

The findings are interesting, and support the notion that contagion effects between banks are significant and strong. For the entire sample of contagion regressions, the contagion coefficient averaged 12 percent. That is, 12 percent of an idiosyncratic factor affecting Bank B will be picked up by Bank A.

The contagion coefficients were much higher between certain pairs of banks and at certain times. First, everything else being equal, big banks had much larger effects on other big banks than they did on small banks (and a bigger effect than small banks had on each other). This result is depicted in Chart 1. This finding is consistent with the notion that investors in big banks are monitoring closely the behavior of other big banks.

Chart 1
The Contagion Coefficient By Bank Asset Size: 1980-1990



Second, the contagion effect is greater for banks that are physically close to one another. If the two banks are separated by the length of the country, for example, the contagion effect is weaker by about 50 percent than if the banks are in the same region. This suggests that investors expect fewer common factors to affect distant banks, thereby weakening the transmission of idiosyncratic effects. This is consistent with the "regionalization" of contagions historically.

Third, the contagion effect rises very dramatically during periods of uncertainty. In our case study, such a period was proxied by the time period around the stock market crash of October 1987. The average contagion coefficient was over five times as large during this period as for the sample as a whole. This finding is predicted by the signal extraction models, and implies that the propensity to run can accelerate significantly during times of financial stress.

Fourth, bank stock contagion effects are smaller if the affected bank has a high capital/asset ratio. That is, equity investors in a bank worry less about transmitted effects from other banks if their bank has a sizable capital buffer. This follows from the concern that depositors are more likely to run, and impose costs on the bank, if there is insufficient capital to shield them from adverse events. In our sample, an increase in the capital asset ratio at a bank from 5 percent to 15 percent decreases the contagion coefficient by about 35 percent in normal circumstances, and by 80 percent during the 1987 crash period. This suggests that higher capital ratios provide considerable protection against contagion, particularly during times of financial stress.

Finally, contagion coefficients among bank stocks appear higher than those estimated for nonbank stocks. Using a sample of stock returns from ten randomly selected, broker-defined industry categories, contagion coefficients were estimated for the largest firms in the industry category. The contagion coefficients estimated were three to five times smaller for these nonfinancial firms than for similarly ranked banking firms. One explanation for this finding is that the performance of a bank's assets is difficult for outside investors to assess, causing them to rely more on signals from peer performance than is the case for nonbank firms. This, in turn, is consistent with the notion that banks exist precisely because the risk of certain credits is too difficult for the marketplace to assess directly, requiring a very closely monitored, bank-type relationship.

Caveats

Before translating these results on stock returns into implications for depositor runs, several caveats must be offered. First, it must be recognized that the stock return contagion coefficients were estimated in an environment in which flat-premium deposit insurance existed. With this policy in place, "bad news" is less likely to result in higher deposit costs for a bank, thereby cushioning equity holders. This means that the contagion coefficients I have estimated may understate the degree of contagion that would exist in an uninsured banking system.

Second, the reaction of the value of equity to a piece of bad news is likely to be more pronounced than the reaction of the value of deposit liabilities; this is because equity is the junior security, and thereby cushions debt holders somewhat from deterioration in portfolio value. On the other hand, because bank depositors hold debt that is, by definition, redeemable on demand at low cost, even small decreases in the perceived value of those deposits may precipitate "runs."

Conclusions

Addressing these caveats is beyond the scope of this *Letter*. In addition, we have not provided any evidence that bank panics are costly to the economy. However, the results of our study are consistent with a tendency of the banking system to experience contagious runs. And the pattern of contagion effects accords nicely with the historical record of regionalized panics, and the tendency for panics to propagate among big banks. This suggests that if bank panics are costly, a policy of high capital requirements and deposit protection may be justified as a means of stabilizing a run-prone banking system.

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References

Benston, G., et al. 1986. *Perspectives on Safe and Sound Banking.* Cambridge: MIT Press.

King, M.A., and S. Wadhwani. 1990. "Transmission of Volatility between Stock Markets." *The Review of Financial Studies* 3, pp. 5–33.

Klebaner, B.J. 1974. *Commercial Banking in the United States: A History.* Hinsdale: Dryden Press.

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